

# Alaska's Extreme Ferries



*How the high-speed ferry  
M/V Fairweather is making history  
in southeast Alaska.*

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There is a tender, if not sentimental, tone that many Alaskans use in matters concerning the ferryboats in the Gulf of Alaska. The ferry system's waterways, characterized by a maze of inlets and archipelagos from the outstretched Aleutian Islands in the west to Prince William Sound in central Alaska and Ketchikan in the southeast, have been traversed time and again by a dozen or so mainline vessels since 1963. All of these ferries, some more than 40 years old and capable of holding 750 passengers and 130 vehicles, have essentially served as the transportation life-line and principal means for moving people, goods, and cars throughout the state's coastal communities.

## **Water, Water Everywhere**

To those of us in the "lower 48," understanding a transportation system that offers no other basic public transit option but rugged water journeys might be difficult. Should Alaskan commuters from the southeastern city of Sitka, for example, wish to see a doctor, have a shopping excursion, or, in many cases, simply go to work, it is a multi-hour ferry ride anywhere from 100 to 400 miles that will get them there—not a bus, not their own cars, and certainly not the subway.

But for the U.S. Coast Guard and Alaska Marine

Highway System (AMHS), which governs the state's water transportation services, these unique conditions allowed for maritime history to be written. Last year saw the arrival of the *M/V Fairweather*, a remarkable new member of the state's fleet of passenger-vehicle ferries.

The 235-foot, catamaran-style *M/V Fairweather* is the first high-speed passenger-vehicle ferry in the country. Not only is it a boon to Alaska's distinguished fleet of mainline ferries, it is, at \$35 million, one of the most sophisticated vessels of its kind—a milestone for the Coast Guard and U.S. shipbuilders and the foundation for the rest of the U.S. fast ferry industry.

Where a typical, monohull displacement ferry moves at an average of 18 to 20 knots, the *M/V Fairweather*, at total capacity of 250 passengers and 35 vehicles on board, can achieve service speeds of 35 knots. In its first outing between Juneau and Haines last year, *M/V Fairweather* made the 78-mile run in two hours, half the time of any other vessel in the AMHS fleet.

To reflect on its progress one year after arrival, and after its first full season on feeder routes between Alaska's busy southeastern ports of Skagway, Haines,



Juneau, and Sitka, the *M/V Fairweather* already has a storied, albeit short, life. From its construction—a process entirely overseen by, among others, Coast Guard engineers—to its present operations schedule, the *Fairweather* is painstakingly monitored and maintained by crews, AHMS engineers, and Juneau-based Coast Guard staff, all of whom provide complementary efforts to ensure its success in the name of future fast ferry programs for other coastal cities within the United States.

The *Fairweather* dates back to the late 1990s, when it was the pet project of then-Governor Tony Knowles' administration, whose efforts led to a successful Capitol Hill campaign that raised about \$70 million in initial funding for Alaska's fast ferry program. Upon completion, *Fairweather's* celebrated service launch in spring 2004 was followed by serious labor issues, an engine failure, and some mishaps at sea, illustrating a certain degree of resilience and, if nothing else, cementing its place at home in Alaskan waters, where enduring a challenge with dignity and ingenuity seems to be the norm.

### Revolutionizing the System

AMHS press materials described the *M/V Fairweather* as a new ferry "virtually revolutionizing the 40-year-old Alaska Marine Highway System." A key part of broad plans to expand Alaska's transportation services, *M/V Fairweather* was the first of two fast ferries to be delivered to the state and was followed in spring 2005 by a sister vessel, the *M/V Chenega*. With the *Fairweather* operating as a shuttle ferry in southeastern Alaska, the *Chenega* has been scheduled to serve as a shuttle during the summer months in the Prince William Sound area of south central Alaska, connecting the ports of Cordova, Valdez, and Whittier.

Plans are to utilize both ships as a couplet during the winter months in the busier southeastern region, where the ferries will essentially play tag between Juneau, Petersburg, and Ketchikan. All of this, according to Captain John Falvey, general manager of AMHS, is to see how successful these shuttles operate, so that the state can exercise its option for two more fast ferries by spring 2006.

"We have the option to continue on the trail we are on with this class of vessel," said Captain Falvey. "One of the reasons we're bringing *Chenega* out of Prince William Sound to run it in the southeast is to

try to give us a feel as to how this is going to work, because Ketchikan is, in essence, where the third boat would run."

The incorporation of ferries like the *Fairweather*, its sister ship, and, perhaps, two more will allow long-term plans for more roads in Alaska to come to fruition, according to Captain Falvey. "The state of Alaska is attempting to build roads. We don't have a lot of roads, especially in the southeast," he continued. "Our transportation plan is calling for shuttle ferries to connect road heads."

The new fast ferries change the composition of the state's ferry fleet, said Captain Falvey, which historically has been comprised of large, long-haul mainline vessels. The massive mainline ferries, with lengths up to 408 feet, transport much-needed container vans, perishable food, and freight. They also connect residents, tourists, and commercial goods en masse to Alaska's gateway city of Ketchikan from the lower 48 by way of Bellingham, Washington and Prince Rupert, British Columbia.

"We will always have a certain degree of mainline ferries... there are just some places where the shuttle ferry-to-road head plan won't work because of the topography here," said Captain Falvey. "What we will end up with is a combination of roads, shuttle ferries, and some mainline ferries. The idea behind the fast ferries is to connect road heads. We are slowly getting away from all mainline ferries in the system."

"People are very dependent on the ferry system, especially in the southeast," he continued. "Ketchikan is on an island, and you cannot drive in or out of this town of 14,000 people. You either take one of our boats in or you fly in with Alaska Airlines."

He explained further the idea for stringing ferry shuttle service between Ketchikan all the way up to Haines. Even though cities like Ketchikan and Sitka will always be roadless, AMHS intends to provide faster travel from one point of the state to a road head farther north that leads into the interior with fast ferry service.

"Bottom line is travelers will literally be able to go from Ketchikan to Juneau all in one day," said Captain Falvey of the new fast ferry routes, which promise to cut travel time between those cities in half, eliminating overnight trips on some of these journeys.

**Opposite: The *M/V Fairweather* underway at Auke Bay, northwest of Juneau. The glacier in the background is the Mendenhall Glacier, approximately 15 miles from downtown Juneau. Courtesy Alaska Marine Highway System.**





## Class Society

The *M/V Fairweather* is a high-speed catamaran made of aluminum alloy. A consortium of maritime experts was on hand between 2002 and 2004 to aid in the production and delivery of *Fairweather*, because it was to be the United States' first high-speed passenger-vehicle ferry, built to exacting international standards.

The *M/V Fairweather* was classed by the international classification society Det Norske Veritas (DNV) as "DNV Maltese Cross 1A1 HSLC, R3 Passenger Car Ferry A EO" and with full Coast Guard compliance to SOLAS/HSC Code Category. Formidable as it sounds, the *Fairweather's* classification is "partly regulatory, but mostly an insurance function for shipping," said Lt. Daniel Buchsbaum, assistant chief of inspections in Coast Guard's Marine Safety Office in Juneau.

The Coast Guard played an instrumental role at nearly every stage of *M/V Fairweather's* development—from her production and maiden voyage from the vessel's builders at Derecktor Shipyards in Bridgehampton, Conn., to the high-speed certification and training required to ultimately get the vessel into service.

As a classification society, the DNV has detailed rules for construction and operational maintenance that must be met. The Coast Guard is charged with interpreting the various guidelines dictated by the DNV classification, and it issues international regulatory certificates, specifically the high-speed craft code certificate. For a large vessel like *Fairweather* to remain insured, said Lt. Buchsbaum, it must maintain its classification society certification.

Integral to high-speed craft code protocol was rigorous classroom and on-board training for the crews of the *M/V Fairweather*. The Coast Guard's Marine Safety Office had the role of evaluating the training course that the Alaska Marine Highway developed.

The *M/V Fairweather* is classified as a route-specific vessel, which means that a route manual is created for each vessel, said Lt. Buchsbaum. Under the high-speed craft code, there must be route-specific training for all crewmembers, whereby they have to drive the vessel over the route they will be operating. As part of the training, Coast Guard personnel like Lt. Buchsbaum observed the crew aboard the vessel during route training.

"Not only do you have to be licensed to operate that particular vessel, you also have to be licensed on the route that you travel on, like a pilot would be licensed

to travel on specific waters," said Lt. Buchsbaum. "Everybody who has a license to operate on the vessel, whether it be an engineer or the navigation officers, they have to have a license specific for the route they are traveling. It's a separate endorsement on their license to go to Skagway, a separate endorsement to go to Haines, and a separate endorsement to go to Sitka."

## Cooperation

Awarded the project to build the *M/V Fairweather* and the *M/V Chenega* in February 2002 was Connecticut-based Derecktor Shipyards. Derecktor Shipyards teamed up with the naval architecture firm of Nigel Gee & Associates (NGA) of Southampton, England, and the builders used one of NGA's original designs, developed expressly for Alaska's fast ferry project. The Coast Guard, along with the AMHS and the classification society DNV, formed something of a client trifecta throughout the design and construction process, as contractors Derecktor Shipyards and NGA designed and built the *M/V Fairweather*.

"There were three entities involved, and they reviewed all the plans; then, the Coast Guard, along with the DNV, were both on board to survey the construction," said Mr. Gavin Higgins, general manager of Derecktor Shipyards. According to Mr. Higgins, the Coast Guard and DNV monitored construction every step of the way to make sure *Fairweather* was built to international high-speed code specifications.

"Everybody worked very well on this vessel," said Mr. Higgins. "We worked hard in the beginning to get good, clean channels of communication, so everybody would know what to expect and when they had to get their answers back."

## Star Trek at Sea

According to the high-speed craft code, the bridge on a boat like the *M/V Fairweather* is called an operating compartment. In describing the operating compartment, Lt. Buchsbaum likes to say that a key qualification for someone to operate the giant catamaran is that "the person should be very good at video games," which is to say *Fairweather* is teeming with sophisticated technology and computerized controls.

"There are more than 3,000 points that are monitored on the vessel," said Mr. Higgins. "You have a number of different aids to navigation that are electronic, and they are all there to improve the safety. The charts are all electronic, and the radar is integrated with the charts, so you are getting radar overlays on the charts."

There is also night vision on board.”

One notable piece of equipment essential for operating the vessel is the integrated machinery alarm and control (IMACS), also described as an advanced human machine interface. IMACS enables the ship’s operator to stop not only the main engines but also all equipment on the vessel.

“If you picture a video game where you actually sit in and drive something, it’s comparable to that,” said Lt. Buchsbaum of the unique setup for manning the vessel, which requires two individuals to sit side by side with a console in between and the vast display of IMACS data before them. The operating station also includes standard navigation information and controls, including gyrocompass, GPS, AIS, radar, external microphone, ECDIS chart display, and low-light cameras for night vision. Because the two seated crewmembers are on watch all the time, said Lt. Buchsbaum, they are relieved at 20-minute intervals.

“The fatigue factor sets in because there is a lot of data to keep track of,” he continued. “[Information] is just flying at you, and you are constantly adjusting things and looking at things to sort out where you are going and what is coming at you in terms of targets. It is very exhausting.”

### Design and Speed

The *M/V Fairweather* represents many firsts in the maritime industry. It is the first high-speed passenger-vehicle ferry in the country—most are displacement or monohull ferries, and some, built more recently, are catamaran-style but not designed for speed. *Fairweather* is the first aluminum passenger-vehicle ferry, the first vessel of its kind built to international standards, and the first high-speed ferry run by a major state organization.

*Fairweather* also cost more than a regular displacement ferry. Derecktor’s Mr. Higgins said the vessel construction for *M/V Fairweather* and *M/V Chenega* was the company’s largest commercial project in its 50-year history. A world-class manufacturer of high-speed crafts, yachts, and commercial vessels, Derecktor won the contract largely due to its experience and skill level in the field of highly stressed aluminum construction, machinery installations, and a weight-conscious approach to vessel construction.

The boat was designed to be a safe, high-speed, roll-on/roll-off passenger ferry that interfaced with existing AMHS docks and pier side facilities. It will travel

up to 36 knots, or 41 miles per hour, and remain comfortable through sea conditions of up to 10-foot waves, or Sea State 6.

With its lightweight aluminum twin-hull design, the fast ferry is powered by four medium-speed diesel engines, which are bigger engines with more horsepower. The propulsion system calls for four MTU 16V595 diesel engines that drive four Kamewa 90SII water jets. With four powerful engines and two long, thin hulls, this kind of ferry planes across the water. Mr. Higgins credits the designer, NGA, for doing extensive research in hull forms.

“The reason we use catamarans for high-speed ferries is basically, as the ferry goes faster, you start to create an enormous wave and the ferry goes into a semi-planing and then full planing mode,” said Mr. Higgins.

The catamaran’s two giant hulls allowed the builders to put a bigger deck area between them, he said. To try to make one long, slender hull stand up on its own, the deck area would be too wide and too weighty. “With the catamaran, you have long slender hulls, which are low weight, and, consequently, the resistance to push the boat through the water is lower,” he added.

While catamaran ferries are nothing new, according to Lt. Buchsbaum, naval architects like the firm of Nigel Gee have been re-engineering the catamaran hull form to get more out of the vessels, such as greater speed and better riding vessels in heavy seas.

“The other catamaran ferries do not conform to the properties found in the *Fairweather* to provide increased speed,” said Lt. Buchsbaum. “Part of that success for speed has come because of the high-speed craft code that allows naval architects to take advantage of lightweight materials like aluminum to significantly decrease the weight of the vessel.”

Mr. Higgins was quick to point out that the fast passenger-vehicle ferry is not for everyone. Through a fair amount of voyage analysis, he discussed some important variables in terms of optimizing high-speed ferries.

“The application of a high-speed ferry is dubious,” said Mr. Higgins. “Unless it is a reasonable amount of time spent at high speed, the difference of the cost of [a regular displacement ferry] with a fast ferry doesn’t make it worthwhile to go high speed.” Fast ferries

like *M/V Fairweather* are best suited, according to Mr. Higgins, to particular geographic areas with large distances that need to be covered. Such conditions are more conducive to high-speed ferries than other regions with smaller stretches of waterways.

“You need to assess the advantages of traveling at high speed,” said Mr. Higgins. “The time that you take to cycle from one end of your journey to the other end of your journey is very important to what you do during that journey. In terms of the time you spend loading and pulling away from a pier, voyag-



**The high-speed ferry *M/V Fairweather* operates from Alaska Marine Highway System terminal at Auke Bay. Courtesy Alaska Marine Highway System.**

ing from one point to another, slowing down, docking and discharging, and getting ready to receive new freight on board, that whole time period is important, and you need to analyze how much of that time was spent operating at high speed. There is a break-even point.”

Mr. Higgins emphasized the use of passenger-vehicle ferries versus only passenger ferries. In New York Harbor, for example, he said it all boils down to cost. “There aren’t many runs in New York that would make it worthwhile for actually running a real high-speed passenger-vehicle ferry,” said Mr. Higgins. “Around New York Harbor, there are a lot of runs where it makes sense to run high-speed passenger ferries, but a real high-speed passenger-vehicle ferry is a pretty expensive animal these days, and you’ve got to have a run probably somewhere in excess of 15 miles to really make it pay off.”

Of the *M/V Fairweather*, Mr. Higgins said: “In Alaska, you have the unique situation where you basically have a lot of communities that are separated by water or by roads. The *M/V Fairweather* runs daily between Juneau to Haines to Skagway—60 miles straight north before she goes to Sitka, which is another 120 miles. So, *Fairweather* goes to Haines twice a day and Skagway once a day, and this winter, down to Petersburg. Those are all excellent runs. These are big distances. We are chopping up big distances and bringing them down to manageable time slots. It is a great application of high-speed ferries.”

While *Fairweather* carries up to 35 vehicles, other ferries in the AMHS fleet can carry up to 130 vehicles, including vans and trucks that move much-needed supplies from island to island. Overall, AMHS ferries move about 85,000 cars per year in southeast and southwest Alaska.

Mr. Higgins likened the *M/V Fairweather* to a high-speed ferry *Derektor* completed in 1998 for Buquebus of Argentina, the *Patricia Olivia II*. Designed also by Nigel Gee & Associates, the *Patricia Olivia II* makes runs up to 100 miles from Buenos Aires to Montevideo, Paraguay, at operating speeds of about 53 knots. Also used to carry cars and passengers, the Argentinean vessel reached trial speeds of 57.5 knots.

### Growing Pains

The efficiency and speed of the *M/V Fairweather* ushered in a brief but significant firestorm of labor problems for AMHS almost immediately after the ferry

arrived in Alaska. Because *Fairweather’s* journeys were markedly faster than those of mainline vessels, there was no need for more than one crew a day, as compared to the older long line vessels that historically carried larger crews who rotated shifts and berthed on the boats. The high-speed *Fairweather* had, in essence, created a hub system, allowing its operational crew of 10 to operate during the day and go home at night. Moreover, *Fairweather’s* service schedule fluctuated from more operations in summer and fewer voyages in winter, thus, further reducing the staffing needs.

Involved in the complicated negotiations on behalf of ferry operators were three maritime unions that represented them: the Inland Boatmen’s Union; the Marine Engineers Beneficial Association; and the Masters, Mates & Pilots. Bargaining continued for nearly one year and required, at one point in January 2005, that the *Fairweather’s* service altogether cease operations until an agreement could be made between the three unions and Alaska’s Department of Transportation.

In March 2005 the state and the unions reached an agreement outlining the number of crews and work schedules for winter and summer seasons. By the end of March 2005, the *M/V Fairweather* was back in service. “It took some time, but we resolved that issue,” said Captain Falvey. “It is important to understand that for 40 years we’ve run mainline vessels where these crews work one to two weeks at a time. They live on the ship, and it is a 24-7 operation.”

The new contracts are “a 180-out” from the old contracts, said Captain Falvey. It was very difficult negotiating those agreements, he added, because they were “very, very different from a mainline contract.”

### Murphy’s Law

The *M/V Fairweather* was not without a few mishaps in its inaugural year in 2004. After a one-month delay, due to a longer-than-planned route training schedule, the long-awaited ferry officially started service at 7:00 a.m. on June 7. In her first spring-summer season—the warmer months in Alaska mean more ferry rides and calmer weather conditions—the vessel carried passengers between Haines, Juneau, Skagway, and Sitka without incident until early September, when one of the ferry’s four engines failed.

While the vessel continued to run on three engines, AMHS announced that service to Sitka—which was at least 150 miles from the other three ports—would



be dependent on tides and winds. Still under warranty, the *Fairweather's* German-made engine was replaced at no cost during the vessel's scheduled lay-up period in October of that year. "The boat stayed online through its season. We didn't lose any time because of the engine failure, which is a big testament to everyone," said Mr. Higgins, who was on hand for the engine replacement last fall.

On a few occasions, the *Fairweather's* lightweight aluminum frame and the elements of nature have also refused to cooperate. While departing Skagway early in the morning on September 21, 2004, the ferry allided with three of five stern lines of the *Zaandam*, a moored Holland America cruise ship. The ferry cut the lines in two and was pushed into a mooring dolphin. With 52 passengers, 10 crew, and 17 vehicles onboard, the *Fairweather* suffered minor damages, and the incident did not cause any injuries on either ship. An investigation shortly after revealed that a strong wind pushed the vessel off course.

*Fairweather* endured another incident on a stormy December afternoon in 2004, during a regularly scheduled Haines to Juneau trip, when the vessel was hit hard by large waves in Lynn Canal. With no injuries to passengers, the *Fairweather* was able to proceed to its berth, where it was taken out of service for repairs. The cowling, a non-structural, protective component designed to deflect water from the front of the boat between the two hulls, was bent inward by the force of the wave that hit the vessel.

According to Lt. Buchsbaum, the rated speed per wave height was not correct. The Coast Guard recalculated the speed per wave height and required a reduced speed with increased waves. With minimal wave heights, *Fairweather* may operate at a top speed of 42 knots. When conditions are calm in Lynn Canal, the vessel has reached 42 knots, said Lt. Buchsbaum. However, when currents are stronger and wave heights are higher, the vessel is required to slow down.

Those familiar with the vessel acknowledged that it might have been traveling too fast for current conditions when the damage was sustained. "The vessel can operate in those conditions," said Mr. Higgins of the severe weather that day, "but it just has to operate slower. It was seeing very high pressure under the wet deck."

## Alaska's Main Attraction

Alaska's ferries service 32 communities in the state and carry about 300,000 passengers every year. The ferry system is billed, more often than not, as one of Alaska's top attractions. As described in one prominent tourism publication, an Alaskan ferry offers waterway scenery and the flexibility to experience Alaska's best-kept secrets.

The Alaskan perspective is somewhat different, according to Lt. Buchsbaum, for the ferries, from the grand old monohulls to the sleek, new *Fairweather*, are simply essential. They are the only way a resident can get around, and the only form of transportation that is cost effective. Still, there is no denying that they are as pleasurable as they are utilitarian, offering incredible scenery and almost always the promise of seeing a whale.

Describing a southeast inlet called Peril Strait, traversed regularly by the *Fairweather*, Lt. Buchsbaum said: "If you are out on the water in places where there are smaller inlet passages, the glaciers have essentially cut their way through the passes here. So your mountains are very tall and they are right next to the water...deep water right next to the shore. On either side as you transit, you are very close to the shoreline. It's extremely close, and just beautiful."

A ferry ride is an intoxicating journey to most, routine to the average Alaskan citizen. Nonetheless, in a resident's letter to the *Juneau Empire*, the *Fairweather's* arrival, while making nautical history around the world, "gave cause for much celebration," but, most likely, for an entirely different set of reasons. For the U.S. Coast Guard, as one of its many marine safety initiatives in the state of Alaska, the integration of the *M/V Fairweather* and the high-speed program into the state's valued ferryboat system has been nothing if not a promising, fascinating process, and one that will serve future programs well.

**About the authors:** Lt. Cmdr. William T. Jeffries has been with the Coast Guard for 20 years and recently assumed the post of Chief of Port Operations at the Anchorage Marine Safety Office (MSO). He served four years previously as Chief of Inspections in Juneau's MSO, where he inspected the *M/V Fairweather* upon her arrival in 2004.

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